

# 國立中央大學大氣物理研究所書報討論

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## **Comparing 3DVAR and hybrid radar data assimilation methods for heavy rain forecast**

### **Abstract**

A meso- $\beta$ -scale precipitation system can cause heavy rain in a matter of minutes and create damage to property, agriculture and people. Radar data assimilation can greatly improve the prediction accuracy of heavy rain and it is essential. In this study, comparing three dimensional (3D) variational (VAR) and hybrid data assimilation (DA) methods prediction accuracy by conducting experiments of three heavy rainfall events and proving its effectiveness. Experiments on heavy rainfall events and analysis of precipitation patterns and cloud microphysical processes were conducted to evaluate the effect of radar data assimilation and prediction accuracy.

According to the results of the paper, hybrid data assimilation method simulated convective bands, wind convergence, and higher water vapor mixing ratios compared to 3DVAR. Also the root mean square error of cumulative precipitation was lower with radar data assimilation, and the hybrid method showed better precipitation forecast accuracy than 3DVAR. Further, this study to summarize the radar data assimilation indirectly changed water vapor, rain, snow, and graupel mixing ratios, with water vapor having the greatest impact on microphysical processes. Creating an environment for water vapor to transform into precipitating hydrometeors and grow through cloud microphysical processes is critical for accurate heavy rain forecasts.

### **Keyword**

Radar data assimilation

### **Reference**

Ji-Won Lee, Ki-Hong Min, Kyo-Sun Sunny Lim, (2022). "Comparing 3DVAR and hybrid radar data assimilation methods for heavy rain forecast." Atmospheric Research, Volume 270.